CLAIM AMENDMENTS

Claims 1-20 were originally submitted. Claims 11-15 are allowed. Also, claims 3, 4, 9, 10, 17, and 19 would be allowable if rewritten to overcome 35 USC 112 objections for indefiniteness. However, the remaining claims 1, 2, 5-8, 16, 18, and 20 are rejected under 35 USC 103. The applicants herein have provided amendments to their claims, and believe that they have done so to overcome the 35 USC 112 objections without adding new matter. They have provided proper antecedent where needed, and have also removed indefinite language. They also believe that the amendments made have provided a definition of their invention that is different from the cited prior art. A listing of the claims is enclosed with this response, with each claim marked as to its current status and amended claims showing the language added marked with underlining and deleted language having strike-through markings. Since claims 11-15 are allowed, they were not amended. Further, the applicants believe that they have amended their claims 3, 4, 9, 10, 17, and 19 so that they are no longer based on a rejected claim, and they respectfully request the Examiner to reconsider their currently amended claims and allow them.

During the amendment of their claims, instead of canceling claims 1 and 16 and importing the subject matter therein to allowable claims 9 and 19 depending respectively therefrom, as proposed by the Examiner, the applicants did the reverse and imported the original subject matter relating to debris cutters from claims 9 and 19 respectively into claims 1 and 16, so that claims 1 and 16 would instead be considered allowable. Claims 9 and 19 were then amended to include other subject matter from the specification. Since this amendment strategy preserved much of the original claim language, the applicants believed that this would be a straightforward approach and achieve the same result proposed by the Examiner. The

Examiner's specific objections and rejections are noted below, with the applicant's proposed remedy also identified in the same paragraph.

Claim 13 is objected to due to the absence of a period at its end. The required punctuation has been added. Therefore, the applicants herein respectfully request that the Examiner withdraw the objection noted in paragraph 2 of the Office Action.

Claims 1-10 and 16-20 are rejected under 35 USC 112, second paragraph, as being indefinite. The applicants have provided antecedent where it was previously missing and canceled the claim language that was determined to be indefinite. Therefore, the applicants herein respectfully request that the Examiner withdraw the objection noted in paragraph 4 of the Office Action.

Claims 1, 2, 5, 16, and 20 are rejected under 35 USC 103(a) as being unpatentable over Aschauer 061 in view of Dahle and Aschauer 526. However, the applicants believe that there are many differences between the present invention and the Dahle and Aschauer inventions. One example is that the Dahle invention requires a marine transmission. The present invention does not, and instead its mechanisms for turning and reverse are provided by the discharge of fluids in combination with its rudder system, including a reverse flow gate. Also, the present invention does not cause a resistance or reduction of thrust by positioning the rudder in the discharge flow. Further, the present invention does not use precision bearings. Instead conventional marine bearings and shaft are used. In addition, propellers used in the present invention are of a standard design. Also, the present invention water inlet is of a proven shape that allows fluids to flow freely without obstruction, screens, or bars across it that clog the opening. Further, the present invention has debris-cutting members positioned in front of its first propeller, between its propellers, and in front of its strut. In addition, the present invention is tapered across its entire length to accelerate the constant volume of fluid flow there across, so as to generate a reaction of forward thrust that is greater than that provided its four augers alone, which are constant in pitch from front to rear. The present invention also requires no grease seals and the bearings are of a

widely available proven design. In addition, the present invention can be disassembled and reconditioned easily with standard parts of marine design. In contrast, the Dahle unit cannot be installed as shown, the transom would not permit it. Further, the Dahle front seal cannot be replaced in the water as claimed, since the hole (45) is too inaccessible. Quite the converse, the present invention is of conventional design with regard to parts replacement and function. Further, the Dahle design cannot be disassembled, since both of its ends are reduced in diameter, preventing shaft removal, as well as removal of the auger attached to the shaft. The Aschauer design is unlike the present invention since the present invention does not use reduction gears, nor are they necessary. Although steering in the Aschauer is unclear, it cannot be reversed without a marine transmission. The Aschauer unit is incorrectly designated as a hydraulic jet propulsion apparatus. In reality it is a reaction jet, and not hydraulic. The present invention is truly a reaction thruster and not a jet. A jet must use a fluid to expand past its normal state and discharge this fluid at a volume of greater magnification than the static state of water. The present invention unit does not accelerate the fluid to a state of velocity to create a pressure differential that can push the vessel forward. This is equated by a boy floating on a raft with a steel ball in his left hand. He must throw this steel ball to shore. When the steel ball leaves his hand, the weight of the ball will cause the raft to react in a direction opposite of the steel ball. The raft will accept this thrust reaction and move away from the shore. This is not a jet, but merely a reaction to the energy released by the boy's arm. The present invention is a thruster and the Aschauer unit is not a jet but merely a crude thrust device of impossible construction and design. The use of reduction gears for moving water or a fluid is better accomplished by reducing the pitch of the wheels or screws as they are called in marine jargon, and increasing the diameter to move the amount of fluid desired. Aircraft use reduction gears for the discharge of the fluids to move an aircraft forward when diameter is too large. In contrast, the present invention is simple, practical, and functional. Further, claims 1 and 16 have now each been amended to contain the debris cutting subject matter originally disclosed respectively in the

original claims 9 and 19, which were considered by the Examiner to be allowable if presented in an independently written form that included all limitations of the base claim and intervening claims. Therefore, instead of claims 9 and 19 being rewritten, their limitations have been incorporated respectively into claims 1 and 16, with claims 2 and 5 depending from the newly amended claim 1, and also with claim 20 depending from the newly amended claim 16. Thus, the applicants submit that the amendments to their claims made herein define an invention that is patentably distinct from the Dahle and Anschauer inventions, and they respectfully request that the Examiner withdraw his rejection of claims 1, 2, 5, 16, and 20 in paragraph 6 of the first Office Action.

Also, claims 6-8 and 18 are rejected under 35 USC 103(a) as being unpatentable over Aschauer 061, Dahle, and Aschauer 526, and further in view of Smith that discloses a reverse and steering assembly with Ackerman geometry. The applicants incorporate their arguments above herein relating to Dahle and Aschauer, and again submit that their amended claims now define an invention that is patentably distinct from the Dahle and Aschauer inventions. Therefore, they further argue that the addition of Smith to provide a reverse and steering assembly with Ackerman geometry is insufficient in combination with the Aschauer and Dahle inventions to teach, suggest, or reveal the present invention. Therefore, the applicants respectfully request that the Examiner withdraw his rejection of claims in paragraph 7 of the first Office Action.

Listing of All Claims with Identification of Current Status, with additions underlined and canceled language having strike-through markings.

1. (Currently Amended) A marine reaction thruster for use within a marine hull, said thruster comprising:

an elongated housing having a cross-sectional configuration and opposing ends, a drive shaft opening through one of said opposing ends and a discharge opening through the other of said opposing ends, a wide end adjacent to said drive shaft opening, a bottom fluid inlet opening in said wide end, an upper opening, a tapering central portion between said inlet opening and said upper opening, and a tapering narrow end between said upper opening and said discharge opening;

a drive shaft extending longitudinally through said housing between said drive shaft opening and said narrow end of said housing, said drive shaft having a distal end;

a plurality of propellers having different diameter dimensions, each of said propellers being supported by said drive shaft and positioned for rotation within said tapering central portion of said housing, with the largest one of said propellers being adjacent to said inlet opening and the remainder of said propellers being positioned according to decreasing size between said largest propeller and said upper opening, said diameter dimensions of said propellers being selected to substantially fill said cross-sectional configuration of said housing;

inflow inducing means adapted for causing a large volume of fluid to flow through said inlet opening of said housing and into said wide end of said housing; ~~and~~

at least one debris cutter supported by said drive shaft for rotation and said at least one

debris cutter being positioned relative to said propellers so that debris in seawater entering said bottom fluid inlet opening of said housing is ground into smaller pieces before it has an opportunity to slow rotation of said propellers; and

strut means associated with said upper opening in said housing and adapted for securing said distal end of said drive shaft so that the velocity of fluid moving across each successive one of said propellers is increased ~~for a total trust reaction in fluid exiting said discharge opening of at least approximately twenty percent more than conventional propulsion systems of comparable size~~.

2. (Currently Amended) The thruster of claim 1 wherein said propellers are each positioned on said shaft at a ~~maximum~~ pitch angle of between approximately 10^{o} ~~to~~ and 12^{o} ~~for elimination of outgassing and cavitation~~.

3. (Original) The thruster of claim 1 wherein said fluid inflow means comprises an inlet plate having a keyhole-shaped opening with a smaller end that is positioned in the direction of forward movement of the marine hull to which it is attached, said keyhole-shaped opening being aligned with said inlet opening in said housing, and recessed fastener openings, said keyhole-shaped opening having a wider end and being configured with outside edges designed to cause eddys to form and seawater to flow therethrough at the center portion of said outside edges.

4. (Original) The thruster of claim 3 wherein said inlet plate further comprises a plurality of recessed fastener openings for flush mounting within a marine hull.

5. (Original) The thruster of claim 1 further comprising a front casting connected to the one of said opposing ends of said housing having a drive shaft opening.

6. (Original) The thruster of claim 1 further comprising a reverse and steering assembly

aligned with the one of said opposing ends of said housing having said discharge opening, and wherein said reverse and steering assembly comprises rudders and a movable gate selectively positioned to block rearward flow of fluid exiting said discharge opening of said housing and traveling through said reverse and steering assembly.

7. (Original) The thruster of claim 6 wherein said rudders are connected by a tie bar and have Ackerman geometry that allows one to move more than the other and vice versa.

8. (Original) The thruster of claim 6 wherein said rudders have a crescent-shaped configuration.

9. (Currently Amended) The thruster of claim 1 wherein said at least one debris cutter further ~~comprising~~ comprises a debris cutter ~~supported by said drive shaft for rotation and cutting in the direction of rotation, with said debris cutter~~ being positioned adjacent to and forward of all said propellers.

10. (Currently Amended) The thruster of claim ~~9~~1 wherein each said propeller has a hub, and further comprising at least one additional debris cutter supported by said drive shaft for rotation and cutting in the direction of rotation, with said at least one additional debris cutter being selected from a group consisting of cutters positioned at one of said hubs and forward of the next adjacent one of said propellers and cutters positioned forward of said strut.

11. (Currently Amended) A marine reaction thruster for use within a marine hull, said thruster comprising:

an elongated housing having a cross-sectional configuration and opposing ends, a drive shaft opening through one of said opposing ends and a discharge opening through the other of said opposing ends, a wide end adjacent to said drive shaft opening, a bottom ~~water~~ fluid inlet

opening in said wide end, an upper opening, a tapering central portion between said inlet opening and said upper opening, and a tapering narrow end between said upper opening and said discharge opening;

a drive shaft extending longitudinally between said drive shaft opening and said narrow end of said housing, said drive shaft having a distal end;

a plurality of propellers having different diameter dimensions, each of said propellers being supported by said drive shaft and positioned for rotation within said tapering central portion of said housing, with the largest one of said propellers being adjacent to said inlet opening and the remainder of said propellers being positioned according to decreasing size between said largest propeller and said upper opening, said diameter dimensions of said propellers being selected to substantially fill said cross-sectional configuration of said housing, and further wherein said propellers are each positioned on said drive shaft at a maximum pitch angle of 10° to 12° to eliminate outgassing and cavitation;

an inlet plate having a keyhole-shaped opening with a smaller end that is positioned in the direction of forward movement of the marine hull to which it is attached, said keyhole-shaped opening being aligned with said inlet opening in said housing, and recessed fastener openings, said keyhole-shaped opening having a wider end at rear and being configured with outside edges that widen from the smaller end causing eddys to form and seawater to flow therethrough at the center portion of said outside edges; and

strut means associated with said upper opening in said housing and adapted for securing said distal end of said drive shaft so that the velocity of fluid moving across each successive one of said propellers is increased for a total thrust reaction in fluid exiting said discharge opening of

at least twenty percent.

12. (Original) The thruster of claim 11 wherein said strut means comprises a strut plate configured for connection to said housing over said upper opening and a strut downwardly depending from said strut plate into said housing.

13. (Currently Amended) The thruster of claim 11 further comprising a reverse and steering assembly aligned with the one of said opposing ends of said housing having said discharge opening for fluid communication therebetween, and wherein said reverse and steering assembly comprises two crescent-shaped rudders with Ackerman geometry and a gate movable between a position that allows rearward flow of fluid from said reverse and steering assembly and a position whereby said rearward flow of fluid from said reverse and steering assembly is blocked[[[.]]]

14. (Original) The thruster of claim 11 wherein said rudders are connected by a tie bar and have Ackerman geometry that allows one to move more than the other in a selected turn and vice versa, while not creating drag or turbulence when in a steering mode.

15. (Original) The thruster of claim 11 further comprising at least one debris cutter supported by said drive shaft for rotation, with said at least one ~~additional~~ debris cutter being positioned relative to said propellers so that debris in seawater entering said inlet opening is ground into smaller pieces before it has an opportunity to slow rotation of said propellers.

16. (Currently Amended) A method of manufacturing a marine reaction thruster for a marine vessel having an engine and a hull, ~~which causes a total thrust reaction for the marine vessel of at least twenty percent more than conventional propulsion systems of comparable size,~~ said method comprising the steps of:

providing a marine hull, an elongated housing having a wide end, a narrow end, and a tapering central portion therebetween, a drive shaft, inflow inducing means, strut means, at least one debris cutter, and a plurality of propellers each having a different diameter dimension sized for positioning said propellers within said tapering central portion of said housing at a spaced-apart distance from ~~the other ones of said propellers~~ one another and said diameter dimensions of said propellers also being only slightly smaller than said housing when positioned within its tapering central portion;

creating a bottom fluid inlet opening in said housing adjacent to said wide end;

creating an upper opening in said housing between said central portion and said narrow end;

creating a drive shaft opening in said wide end;

creating a discharge opening in said narrow end;

securing said housing within said marine hull;

positioning said propellers on said drive shaft for rotation at maximum pitch angles of approximately 10^{o} to 12^{o} with pitch increases so as to maintain fluid velocity while increasing the discharge volume for increased thrust ~~and in decreasing order of said diameter dimension~~;

positioning said at least one debris cutter relative to said propellers so that debris in seawater entering said bottom fluid inlet opening is ground into smaller pieces before it has an opportunity to sloe rotation of said propellers;

extending said drive shaft through said drive shaft opening in said housing so that said propellers are positioned within said tapering central portion of said housing and the largest one of said propellers is adjacent to said inlet opening;

using said strut means in association with said upper opening to secure said drive shaft and said propellers centrally within said tapering central portion of said housing; and

aligning said inflow inducing means with said inlet opening so that a large volume of fluid is caused to flow through said inlet opening of said housing when said marine hull moves in a forwardly direction.

17. (Currently Amended) The method of claim 16 wherein said fluid inflow inducing means comprises an inlet plate having a keyhole-shaped opening with a wider end, a smaller end, and said wider end having outside edges designed to cause eddys to form and seawater to flow into therethrough at the center portion of said outside edges, and further comprising the step of positioning said smaller end in the direction of forward movement of said marine hull, and the step of aligning said keyhole-shaped opening with said inlet opening in said housing.

18. (Original) The method of claim 16 further comprising a step of providing a reverse and steering assembly thruster having ~~eresecent-shaped~~ rudders with Ackerman geometry and a gate movable between a position that allows rearward flow of fluid from said reverse and steering assembly and a position whereby said rearward flow of fluid from said reverse and steering assembly is blocked, and also comprising a step of aligning said reverse and steering assembly with said discharge opening in said housing.

19. (Currently Amended) The method of claim ~~16 further comprising the steps of providing at least one debris cutter, supporting said at least one debris cutter on said drive shaft for rotation and cutting in the direction of rotation, and positioning said at least one debris cutter relative to said propellers so that debris in seawater entering said inlet opening is ground into smaller pieces before it has an opportunity to slow rotation of said propellers~~ 18 wherein said

rudders have a crescent-shaped configuration.

20. (Original) The method of claim 16 wherein said steps of creating, securing, positioning, and aligning are accomplished in a different order.

DRAWINGS

The diagram in paragraph 5 of the original specification has been removed and is being filed herein as a drawing sheet marked as Fig. 16. Since Fig. 16 is not being added to an existing drawing sheet, no sheet marked as an 'Annotated Sheet' has been filed, and only a page marked as a 'New Drawing Sheet" accompanies this Office Action response.